

CLAIMS

I claim:

1 1. A composite material forming a strap for restraining freight, the material
2 comprising:
3 a. a first layer comprising a plurality of strands comprising yarn having an
4 elongation characteristic within the range of about 2.5 percent to about 4.7 percent before
5 breaking and a creep of less than about 2 percent after elongation; and
6 b. a second layer of non-woven fabric comprising a substrate attached to the
7 first layer.

1 2. The composite material of claim 1, wherein the substrate is a spunbonded,
2 polyester, nonwoven fabric.

1 3. The composite material of claim 1, further including a portion having a third
2 layer comprising an adhesive substance positioned between the first layer and the second
3 layer.

1 4. The composite material of claim 1, wherein each of the plurality of strands of
2 yarn in the first layer is positioned generally parallel to a longitudinal axis of the second
3 layer and side-by-side and together formed into woven fabric.

1 5. The composite material of claim 1, further comprising a releasable adhesive
2 layer located on at least a portion of an outer surface of the composite material for
3 attachment to a surface of a transportation vehicle.

1 6. The composite material of claim 1, further including at least one finger edge
2 positioned on at least a portion of a length of the composite material.

1 7. The composite material of claim 6, wherein the first layer has a width less
2 than a width of the second layer and the at least one finger edge is formed by positioning
3 the first layer equidistant between a bottom edge of the second layer and a top edge of the
4 second layer.

1 8. The composite material of claim 1, wherein the first layer and second layer
2 collectively comprise about 0.017 inches in thickness and about 8 inches in width.

1 9. The composite material of claim 1, further comprising at least one
2 reinforcement strap coupled to the composite material forming a strap and positioned
3 generally parallel to a longitudinal axis of the strap.

1 10. The composite material of claim 1, wherein the yarn has a denier of about
2 1500.

1 11. A method of securing freight, comprising:

a. affixing a composite material forming at least one strap for restraining freight to a surface of a transportation device, wherein the composite material comprises:

i. a first layer comprising a plurality of strands comprising yarn having an elongation characteristic within the range of about 2.5 percent to about 4.7 percent before breaking and a creep of less than about 2 percent after elongation; and

ii. a second layer of non-woven fabric comprising a substrate attached to the first layer;

b. positioning freight on the surface of the transportation device; and

c. securing the freight by wrapping the at least one strap around the freight.

12. The method of claim 11, wherein securing the freight further comprises joining a first end of the at least one strap to a second end of the at least one strap.

13. The method of claim 12, further comprising:
a patch comprising a third end and a fourth end, wherein the third end is pre-attached to the strap at a contact section near the first end prior to installation around the freight.

14. The method of claim 12, wherein securing the freight further comprises:

d. inserting a tool having a means for hold the first end of the at least one strap;

e. clamping an arm of the tool to the second end of the at least one strap;

f. rotating the tool until the at least one strap becomes generally taut;

5 g. adhering a patch across an intersection between the first and second ends of
6 the at least one strap using an adhesive; and

7 h. removing the tool from the first and second ends of the at least one strap.

1 15. The method of claim 14, wherein the adhesive for adhering the patch is a
2 non-releasable adhesive.

1 16. The method of claim 11, wherein securing the freight comprises a single
2 person using a tensioning tool to tighten the at least one strap around the freight and to
3 secure the at least one strap in a tightened position.

1 17. The method of claim 11, wherein affixing the composite material to the
2 surface is accomplished using a releasable adhesive.

1 18. The method of claim 11, wherein the surface for affixing the composite
2 material is selected from the group comprising a floor or a wall.

1 19. The method of claim 15, wherein the composite material further comprises at
2 least one reinforcement strap coupled to the at least one strap and positioned generally
3 parallel to a longitudinal axis of the strap and further comprises coupling a first end of the
4 at least one reinforcement strap to a second end of the at least one reinforcement strap.

1 20. A strap for restraining freight, comprising:

2 a. a first layer comprising a first end and a second end; and
3 b. a patch comprising a third end and a fourth end, wherein the third end is pre-
4 attached to the strap at a contact section near the first end prior to installation around the
5 freight.

1 21. The strap of claim 20, wherein the first layer is a nonwoven fabric.

1 22. The strap of claim 21, wherein the nonwoven fabric is a spunbonded,
2 polyester, nonwoven fabric.

1 23. The strap of claim 20, further comprising a second layer comprising a
2 plurality of strands of yarn forming a strap for restraining freight, wherein the yarn has an
3 elongation characteristic ranging from about 2.5 percent to about 4.7 percent before
4 breaking and a creep of less than about 2 percent after elongation.

1 24. The strap of claim 20, further comprising a third layer defining a releasable
2 adhesive located on at least a portion of an outer surface of the strap for attachment to a
3 surface of a transportation device.

1 25. The strap of claim 20, further comprising an adhesive layer located on at
2 least a portion of the patch for attachment to the second end of the strap.

1 26. The strap of claim 25, wherein the adhesive is non-releasable.

1 27. The strap of claim 20, wherein the patch is attached to the strap using an
2 adhesive, stitching or thermal bonding.

1 28. The strap of claim 20, wherein the patch is a continuous portion of the first
2 layer and formed during the process of manufacturing the first layer.

1 29. The strap of claim 20, further comprising at least one reinforcement strap
2 coupled to the strap and positioned generally parallel to a longitudinal axis of the strap.

1 30. A method of securing freight, comprising:

2 a. positioning at least one strap, for restraining freight around at least one piece
3 of freight, wherein the at least one strap for restraining freight comprises:

4 i. a first layer comprising a first end and a second end; and

5 ii. a patch comprising a third end and a fourth end, wherein the third end
6 is pre-attached to the strap at a contact section near the first end prior to
7 installation around the freight;

8 b. securing the at least one strap around the freight to create an intersection
9 between one end of the at least one strap and another end of the at least one strap;

10 c. joining the first end of the at least one strap to the second end of the at least
11 one strap;

12 d. placing the at least one strap under tension; and

13 e. adhering the patch across the intersection.

1 31. The method of claim 30, wherein placing the at least one strap under tension
2 comprises:

3 f. inserting a tool, having a means for holding the at least one strap, onto the
4 first end of the strap;

5 g. clamping an arm of the tool to the second end of the strap; and

6 h. rotating the tool until the strap becomes taut.

1 32. The method of claim 30, wherein the adhesive used to adhere the patch
2 across the intersection of the ends is a non-releasable adhesive.

1 33. The method of claim 30, further comprising affixing the at least one strap to
2 a surface of a transportation device using an adhesive.

1 34. The method of claim 30, wherein the at least one strap further comprises at
2 least one reinforcement strap coupled to the at least one strap and positioned generally
3 parallel to a longitudinal axis of the strap and further comprises coupling a first end of the
4 at least one reinforcement strap to a second end of the at least one reinforcement strap.

1 35. A device for tightening a strap around freight, comprising:

2 a. a body capable of being rotated and comprising:

3 i. a means for holding a first end of a strap; and

4 ii. a first head positioned at a first end of the body for receiving a torsion
5 arm; and
6 b. a clamp coupled to the body for holding a second end of the strap and
7 comprising:
8 i. at least two clamp arms, wherein at least one arm is rotatably coupled
9 to the clamp.

1 36. The device of claim 35, wherein the means for holding a strap comprises a
2 slot.

1 37. The device of claim 35, further comprising a cam rotatably coupled to the
2 clamp for securing the at least two clamp arms at a second end.

1 38. The device of claim 37, further comprising a locking arm coupled to the cam
2 for attaching the cam to the clamp arm.

1 39. A method for tightening a strap around a load of freight, comprising:

2 A. positioning at least one strap around at least one piece of freight, the at least
3 one strap comprising a first end and a second end;

4 B. positioning a tensioning tool proximate to the first end and the second end,
5 the tensioning tool comprising:

6 i. a body capable of being rotated and comprising:

7 a. a means for holding a first end of a strap; and

8 b. a first head positioned at a first end of the body for receiving a
9 torsion arm; and
10 ii. a clamp coupled to the body for holding a second end of the strap and
11 comprising:
12 at least two clamp arms, wherein at least one arm is rotatably coupled
13 to the clamp;
14 C. securing the first end within the at least two clamp arms;
15 D. placing the second end within the at least one slot; and
16 E. rotating the body.

1 40. The device of claim 39, wherein the tensioning tool further comprises a cam
2 rotatably coupled to the clamp and wherein securing the first end of the strap within the at
3 least two clamp arms further comprises rotating and securing the cam.